

PORTABLE HIGH SPEED INTERNET ACCESS DEVICE WITH SCROLLING

Prior Art

The background of the present invention includes US Patent # 5925103, Internet
5 Access Device, which describes an improved Internet access system, vastly
different from the present invention. Other prior art would include palm top
computers and hand-held computers that have limited processing power due to
design restrictions. Thus, these portable computers are much slower for
accessing the Internet and World Wide Web.

10
The present invention enhances the host computer's processing speed, data
transfer and retrieval to and from a portable hand held device, with the aid of
specialized embedded software in the host computer. The result is a cost
effective Internet access solution. The present invention also provides an
enhanced method of automatically scrolling a web page image on the browser
and sending blocks of information to the remote device. Further provision for
credit card transactions is made with secured credit card details kept at the host
computer.

Summary

It is an object of the present invention to disclose a portable device that can access the Internet and World Wide Web, at extremely low costs. It is another
5 object of the present invention to provide a secured image transfer between the host computer and the portable device, with off line viewing capabilities.

The present invention discloses a portable device that connects to a cellular telephone. Thus, a means is provided for the device to have a wireless
10 connection to the Internet via a host computer that runs a browser, which takes information received from the Internet or other sources and renders it onto a virtual display in its memory. This information is directed to software, which reduces the color depth of the information to a lower depth color image. This reduced image is then compressed by another software and sent to the portable device of the invention, for displaying to the user. Hence, the portable device receives the compressed image, stores it into memory, and decompresses it prior to display for the user. Thus, the user views a bit map image of a Web page.

20 In another instance, the browser itself may render the information onto a virtual display in its memory with a reduced color depth, and also compresses this reduced virtual display, which eventually gets sent to the portable device. This eliminates the need for other software to perform the same tasks.

25 The image displayed in the browser's window is captured and sent to another "image engine" software which reduces the color depth and compresses the image, which is then sent to the portable device for displaying to the user. Since the browser's window is usually smaller than the entire image rendered onto a

virtual display in its memory, in order to view the entire image on the portable device, the browser traverses the entire image automatically, capturing the image in its window at each location, which is eventually sent to the remote device to be stored in memory. Hence, as the user scrolls to an area outside the display screen on the remote device or approaches the screen boundary, the new area is decompressed from memory to be displayed. Capturing of images, color depth reduction, compression, and sending of the image to the remote device can all occur simultaneously as the browser moves to other areas of the virtual display.

To reduce the risk of intercepted communications containing valuable details such as credit card information, the host computer would contain the user's credit card information in an internal or external database. To further reduce the cost of the remote device, encryption and decryption engines typically used for secured credit card transactions are removed from the device. When the user wishes to make a credit card transaction and all items are selected for purchasing, upon clicking on the ok icon a message is sent to the host computer which inserts the purchase details along with the credit card information from the database into the virtual display in memory. Hence, the web page image is modified and this is sent back to the web server using encryption and decryption between the host computer and the web server. A refreshed web page would be sent back to the host computer usually confirming the transaction.

DETAILED DESCRIPTION OF THE DRAWINGS

The invention is described in more detail below with respect to an illustrative embodiment shown in the accompanying drawings in which:

5

Fig. 1 illustrates elements in the host computer, which communicates with a remote user and the device of the invention, in accordance with prior art.

10

Fig. 2 illustrates the image to be displayed compared with the displayable area of a browser window, in accordance with prior art.

15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
505
510
515
520
525
530
535
540
545
550
555
560
565
570
575
580
585
590
595
600
605
610
615
620
625
630
635
640
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
780
785
790
795
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995

Fig. 3 shows a typical subdivision of the image to be displayed, in accordance with prior art.

Fig. 4 illustrates file formats received and sent by the host computer, in accordance with prior art.

Fig. 5 illustrates the image in the browser window captured by another software to be sent to the remote device.

Fig. 6 illustrates a method of secured credit card purchases on the remote device without encryption or decryption of sensitive information at the remote device.

Fig. 7 illustrates a method of a dragging event on the remote device.

Fig. 8 illustrates the image in the virtual display subdivided into blocks of text and graphics.

Fig. 9 illustrates portions of the image in the virtual display sent in order of priority.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2
--	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	---

5

10

20

25

rendered in the memory is a web page and this information is directed to another software 4, which reduces the color depth of the information (i.e. the entire image comprising graphics and text) which is usually received in 24 bit color, subsequently reduced to a black and white bit map or raster image, in the preferred embodiment. Even though text may appear in black and white, the entire image may be 24 bit color which is reduced to black and white. This reduced image is then compressed entirely using a loss-less method of compression by software 11, using G3 or G4 methods in the preferred embodiment. This compressed image is then sent through a port in the host computer 1, in the preferred embodiment, to the cellular telephone 12 of Fig. 1, which is connected to the portable high speed internet access device 18 of the invention. The portable device 18, which contains a display screen 20 with a transparent touch panel and related microelectronics, receives the compressed image, decompresses it, stores it into internal memory, and displays it for viewing to the user 3.

In another embodiment of the prior art, the cellular phone 12 of Fig. 1 can be replaced by a wire less modem which is connected to the portable high speed internet access device 18 of the invention. This enables the portable device 18 to receive the compressed image, decompresses it, store it into internal memory, and display it for viewing by the user 3.

In another embodiment of the prior art, the cellular phone 12 of Fig. 1 can be replaced by a LAND line or PSTN which is connected to the portable high speed internet access device 18 of the invention. This enables the portable device 18 to receive the compressed image, decompresses it, store it into internal memory, and display it for viewing by the user 3.

In another embodiment of the prior art, the portable device **18**, receives the compressed image, and stores the compressed image into internal memory. The image is decompressed prior to displaying for the user **3** when desired.

5 In other aspects of prior art, the image **5**, as shown in **Figure 2**, contains the information that would normally be displayed on a single Web page. As can be seen in **Figure 2**, the image **5** of the web page that is rendered by the browser **2** onto a virtual display in the memory is usually larger than the virtual window **6** of the browser. The entire image **5** of the web page is sent to the portable device
10 **18**, to be displayed. The window **6** of the browser **2** running in the host computer **1** is set to be the same size as the display window **19** of the portable device **18**, because the portable device's display window is small, and most likely the web page is larger than the window of the browser in the host computer. The reason for setting the browser's window to be approximately the same size as the portable device's window is for formatting purposes, so that text can be formatted to comfortably fit in the portable device's window to be better displayed, without being cut off at the edges or other display related problems, making it easy to read.

20 A CPU resident in the portable device **18** therefore has the ability to decompress a bit map or raster image that may be larger than the size of the display and allow the user to traverse this bit map or raster image on the portable device. The primary method of traversing the image is through conventional scroll bars positioned at the sides of the image. However, buttons or icons may also be
25 used to scroll on the portable device, to enable the user to move the web page relative to the display of the portable device. The CPU present in the portable device performs all scrolling functions, even though messages are sent to the host computer informing it of each scroll instruction. This allows the host

computer to keep a track of the location of the portable device's display screen with respect to the web page.

The host computer receives vector information or compressed data from outside in the form of HTML, JPEG, etc., which is displayed on a web page. That image, in whole or parts, is recompressed and sent to the portable device. The recompressed data format sent to the portable device, is not necessarily in the same format as the compressed data format first received by the host computer, as illustrated in **Fig. 4**. For example, the incoming data from a Web page may be in the form of JPEG which is decompressed and displayed on the browser **2**. This data is recompressed and sent to the portable device but can be in the form of TIFF G4 or other formats, and not necessarily JPEG as initially received.

Another embodiment involves the host computer receiving vector information such as HTML or text and then rasterizing it to bit map format. It can then shown in memory through the virtual browser and is recompressed through a "loss less" method and sent to the portable device.

The image **5** is further divided into sections **7, 8, 9, and 10**, as shown in **Figure 3**. The image is divided after the bitmap or raster is created. The reason for the division is for the purpose of display priority on the user's display. The image **5** is then sent to another program **11** running on the host computer **1 (Fig. 1)**, which compresses the image using a loss-less compression method. The compression method may be group 3 or group 4, or another method. The information is received by a portable device **18** that has the ability to display an image, in its display window **19**. The information is decompressed and displayed in the order of priority such that part of image **7**, which substantially or completely covers the displayable area **19** of the portable device, is decompressed and displayed first and then sequentially the portions **8, 9, 10** of the image are decompressed and

stored in an internal memory of the portable device to be displayed later when the user scrolls up, down, or sideways to these parts of the image.

In other prior art, the browser program **2** takes information received from outside and renders it onto a virtual display in its memory, but not at the high depth of color as originally received. The browser **2** renders the image in a reduced depth of color, such as a black and white image, in the preferred embodiment. Hence, the software **4** is not required for reducing the color depth of the information as the browser program **2** also performs this task. This reduced image is then compressed by the browser program **2** and sent to the portable high speed Internet access device **18** of the invention. The portable device **18**, which contains a display screen **20** with a transparent touch panel and related microelectronics, receives the compressed image, decompresses it, stores it into internal memory, and displays it for viewing to the user **3**.

In a principle embodiment of the present invention with reference to **Fig. 5**, a web page image **21** in the virtual display is featured, which is bigger than the browser window **6** within the Host Computer **1**. The browser's window **6** is set to be approximately the same size as the portable device's window **19**, and the main reason is for formatting purposes, so that text can be formatted to comfortably fit in the portable device's window **19** to be better displayed, without being cut off at the left or right edges, making it easy to read. In the regular browser, when the width of the window is reduced some pages are automatically formatted so that they fit left-to-right justified in that window, and the user can view the entire image by only having to scroll up and down, without also having to scroll left-to-right. In many of the pages that are displayed, when they are formatted on the web page they get formatted such that the left-to-right formatting fits within the window of the browser so that the user does not have to scroll left-to-right, but only has to scroll up and down. The browser **2** of **Fig. 1**, is connected to another

software 22 which captures the image in the browser window 6, which is eventually sent to the portable device 18, to be stored in memory and displayed to a user 3. However, the software 22 is somewhat restricted in only being able to see the portion of the image displayed in the browser window 6. Hence, in order to capture the entire image of the web page 21, the software 22 must instruct the browser to scroll to other segments of the web page to capture all other portions of the image. The software 22 would reassemble the captured segments of the web page in a different location on the host computer 1, before it reduces the assembled image in color depth, compresses it, and sends it to the remote device 18.

In another embodiment of the invention, the software 22 receives the captured segments from the browser window 6 already reduced in color depth by the browser 2 of Fig. 1. The software 22 would then compress each segment and send it to the portable device 18 as blocks of information, which are assembled and stored in memory on the portable device. The browser 2 sends segments of the web page 21 from the browser's window 6 already reduced in color depth to the software 22, which simultaneously compresses each segment and sends it to the remote device 18. Each segment viewed by the user on the display screen 19 is already decompressed by the remote device 18 and as the user scrolls to new segments they are already decompressed from memory ready for viewing.

In a further embodiment of the invention, the browser goes to a first part of the image as illustrated in Figure 5, and captures the segment of the image in the browser's window 6, then sends this segment to software 22 which reduces the color depth and compresses the image, then sends this compressed image to the portable remote device. During the period that the compressed image is being sent to the remote device, the browser automatically scrolls to other segments of the image which are captured and sent in turn to the remote device

which user is logged on to the Internet, and when a user wants to make a purchase over the Internet, the host computer would be able to retrieve all confidential credit card details on file for any user and automatically insert them in the appropriate location on the web page, after the user has selected items
5 desired and clicked ok to purchase. Hence, the host computer would enter the identical information selected on the display screen of the remote device into the exact location in the virtual display in its memory, together with the user's credit card details on file in the database. This modified web page image is sent back to the web server and a refreshed web page response is sent back to the host
10 computer, usually confirming the transaction. Throughout this transaction, no credit card details would be relayed between the remote device **18** and the host computer **1**, providing a secured means for purchasing over the Internet. The host computer **1** would have encryption and decryption engines installed to provide maximum security when relaying the web page complete with credit card details to the web server **23** over the Internet, and also in receiving detailed information from the web server. There may be other ways in which the host computer would send credit card details to the web server, as normally done for credit card transactions. Hence in another embodiment, the host computer would communicate with the web site in the format preferred by that particular web site, for credit card details to be transferred successfully.

In a further embodiment of the invention with reference to **Figure 7**, any event that involves a dragging event is performed by the host computer after the user has completed the event. In particular, when the user **3** wishes to move an
25 object or select characters on the display screen 19 of the remote device **18**, the user would usually click down, drag and then click up or release on a mouse **25** or pointing device connected to the remote device **18**. The click down and click up locations on the display screen are sent as a message from the remote device to the host computer **1**, and the host computer would insert these commands in

the exact locations in the browser. A refreshed image is then rendered in the virtual display in memory at the host computer **1** and then sent to the remote device **18** to be displayed. The host computer does not send any image back to the remote device until the click up is performed and the image is refreshed.

5

10

15
20
25

In another embodiment of the present invention, the browser **2** renders the entire image **21** in its memory with the formatting exactly as the user would see it. In this particular method of formatting, when the user sees the image on a normal computer screen (not per this invention), that is precisely the way it is rendered into memory per the present invention. Unlike other prior art that reformats different parts of the image to send to a remote device, the present invention renders the image exactly the way it is. In the preferred embodiment, the browser **2** identifies parts of the image that need to be reduced or compressed differently. In an alternate embodiment, the software **22** identifies parts of the image that need to be reduced or compressed differently. For parts of the image that contain pictures or graphics, the depth is reduced from 24 bit to 8 bit (or 16 million colors to 256 colors) and also gets compressed by software **22** using a method such as JPEG, which are normally lossy, or any other lossy method of compression. For other parts of the image that contain text, the depth gets reduced from 24 bit to 3 bit and also gets compressed by software **22** using a method such as G3 or G4, which are normally loss less, or any other loss less method of compression. Thereafter, the compressed images are sent to the portable remote device **18** with a top priority placed on lower color depth or text portions, which are sent first. Upon receiving the compressed images, the remote device **18** decompresses, stores into memory and displays these images to the user, first displaying the text portions followed by graphics.

In a another embodiment of the invention as illustrated in **Figure 8**, the image **21** that is rendered by the browser **2** into memory is subdivided into blocks

containing text **23** and blocks containing graphics **24**. The locations of these blocks containing text and graphics, **23 & 24**, are sent from the host computer **1** to the portable device **18** to assist in the reconstruction of the image at the portable device. When the block of information is sent, the location of the block is sent to tell the remote device where to assemble this block in the image. However, a top priority is placed on parts of the image, both text and graphics, that appear in the window of the browser which eventually appear on the display screen **19** of the remote device **18**, as these portions are reduced, compressed and sent first from the host computer **1** to be displayed first on the remote device. The next priority is placed on the lower color depth images such as text outside the window of the browser, which are then reduced, compressed and sent to the portable device. The higher color depth images such as graphics outside the window of the browser are sent after text, all of which is stored into memory on the portable device.

In another embodiment of the invention with further reference to **Figure 8**, the complete image **21** comprising text portions **23** and graphics portions **24** gets rendered into memory by the browser, and is reduced entirely to 3 bit depth of color which is then compressed and sent to the portable device. The image is received at the portable device and decompressed, for displaying to the user. After the 3 bit image is sent from the host computer, then certain portions of the image that need to be of a higher depth of color such as graphics **24**, are reduced to 8 bit depth of color and are compressed and sent to the remote device. These graphic portions of a higher color depth are received at the remote device, decompressed and placed exactly over the same 3 bit color images, thus improving the quality of the graphics portions of the display. A priority is placed on sending of images from the host computer to the remote device. With further reference to **Figure 9**, the image **21** which is rendered into memory by the browser, contains portions of text **23** and portions of graphics **24**.

The display screen area **19** of the remote device, may contain portions of text and graphics with the browser's window also set to be this size. An area **25**, slightly larger than area **19**, is selected whereby all portions of text and graphics within area **25** are reduced in color depth to 3 bit, compressed and sent to the remote device as a top priority. An area slightly larger than the display screen size is selected should the user wish to scroll around the displayed area. This area **25** is decompressed and stored into memory on the remote device **18**, with area **19** displayed to the user. Any portion of graphics **24** within area **25** is reduced in color depth to 8 bit, compressed and sent to the remote device as a second priority. These graphic portions of a higher 8 bit color depth are received at the remote device, decompressed and placed exactly over the corresponding 3 bit color images, thus improving the quality of the graphics portions of the displayed area. The next priority would be placed in taking all other portions of text and graphics outside area **25** of the image **21**, reducing in color depth to 3 bit, compressing and sending these to the remote device. The last priority placed in taking all portions outside area **25** of the image **21**, that need to be of a higher depth of color such as graphics **24**, reducing to 8 bit depth of color and compressing and sending these to the remote device **18**.